

# Adolescents, sexual behaviour and implications for an epidemic of HIV/AIDS among the young

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## Abstract

**Objective**—To determine the patterns of sexual behaviour, condom use and sexually transmitted diseases among young New Zealanders, and the characteristics of those with many sexual partners.

**Subjects**—A cohort of young people enrolled in a longitudinal cohort study, and followed up since age three.

**Methods**—Subjects were interviewed at age 18 years as part of a multidisciplinary health and development study. Questions about sexual behaviour were presented by computer.

**Results**—Overall 862/1027 (83.9%) surviving in the cohort was interviewed. Only 1.4% declined to answer the section on sexual behaviour. Sexual intercourse in the previous 12 months was reported by 57.6% of the young men and 67.9% of the young women. Amongst those who were sexually active more of the young men reported multiple partners than the young women (59.8% v 46.5%  $p < 0.001$ ). There was a trend for increasing number of partners with indices of lower school achievement but no significant association with socio-economic status. Condom use decreased with increasing number of partners for the young women, and for the young men there was no association. Sexually transmitted diseases were reported more commonly with increasing number of sexual partners for both men and women. The rates of sexual activity were substantially higher than reported in a comparable survey 20 years ago.

**Conclusions**—The pattern of sexual behaviour and condom use, and the occurrence of sexually transmitted diseases in this sample give cause for concern about the spread of sexually transmitted diseases including the possibility of an epidemic of HIV among heterosexual young people in New Zealand. The findings should help in targeting health promotional activities within this age group.

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## Introduction

The potential for a major heterosexual epidemic of AIDS in countries which currently have a Pattern 1 spread of HIV, such as the

United Kingdom and New Zealand, will depend on the patterns of sexual behaviour in the population and in subgroups of the population.<sup>1</sup> In the United Kingdom "second generation transmission" (where infection by heterosexual contact occurs from a person themselves infected through heterosexual contact) has recently been recognised,<sup>2</sup> but the overall extent of transmission in this way, and indeed whether such an epidemic will be self-sustaining is still uncertain.

In New Zealand the cumulative incidence of AIDS was 10.2 per 100,000 to mid-1992, very similar to the UK; 85% of persons with AIDS were homosexual or bisexual men, and only 5% were presumed to have been infected by heterosexual contact.<sup>3</sup>

The behaviour of the group who have many sexual partners will have considerable impact on the size of the heterosexual epidemic.<sup>4</sup> Adolescents and young adults have the highest rates of partner change in most developed societies.<sup>5,6</sup> Thus it is in this age group that a heterosexual epidemic of AIDS might become established in such countries. Indeed repeated surveys of HIV prevalence in samples of sexually transmitted disease (STD) clinic attenders in the USA over 10 years have shown the greatest rate of increase to be in teenagers.<sup>7</sup> A survey of disadvantaged adolescents in that country found that the prevalence of HIV infection in young women aged 16 and 17 years was higher than in young men, suggesting significant heterosexual transmission.<sup>8</sup>

The sexual behaviour of adolescents will also affect the prevalence of other STDs. Moreover it may be that unsafe behaviours established in adolescence continue into adulthood. Knowing which teenagers behave in unsafe ways is important for designing effective educational interventions.

We studied sexual behaviour in a cohort of young New Zealanders aged 18 years who have been followed up since the age of three. We also investigated the characteristics of those with many sexual partners. A major aim of the study was to determine whether the current sexual behaviour of young people in New Zealand might put them at risk of a heterosexual epidemic of HIV.

## Sample and methods

The members of the sample were enrolled in the Dunedin Multidisciplinary Health and Development Study, a longitudinal study of a cohort born in Dunedin between 1 April

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1972 and 31 March 1973. They were first assessed at 3 years of age when 1037 of 1139 eligible children were seen. Since then the sample members have been seen every 2 years until 15 years, then at 18 years. The full history of the sample has been described by Silva.<sup>9</sup> The parents of the cohort as a whole have been shown to be slightly socio-economically advantaged compared with the rest of New Zealand, and are predominantly of European origin.

Information about sexual activity was sought for the first time at the assessment at age 18 years during 1990–91. The sample members were asked about sexual intercourse and the number of sexual partners within the previous 12 months, contraception, use of condoms, and their experience of sexually transmitted diseases. These questions were based on the World Health Organisation partner relationships questionnaires.<sup>10</sup> The questions were presented by computer, with an interviewer present who was placed so that she could not see the sample members' responses to the questions. The interviewer instructed the sample members in the use of the computer, and read the questions to the two who had very low reading ability. The questionnaire was piloted in a local secondary school.

Information was sought on condom use as a contraceptive from both males and females who had been sexually active in the last 12 months. The females were also asked about condom use to prevent STDs. The male subjects were asked about condom use for contraception, but unfortunately only those who acknowledged some contraceptive use were asked about condoms to prevent STDs.

For females, condom users were grouped as "usually or always" using condoms if they had reported usually or always using condoms for either contraception or to prevent an STD. They were grouped as "sometimes or never" if they reported using condoms sometimes or never for either purpose. For the males condom use was considered "usually or always" if they reported usually or always using condoms for contraception, or if they reported using condoms to prevent an STD. Use was categorised as "sometimes or never" if they reported sometimes using condoms for contraception and reported not using condoms to prevent an STD, or reported no condom use.

Enquiry into demographic background and schooling was made by interview in a different section of the study. Data were collected on the age of leaving school, and the highest education qualification gained. Analysis of the highest school qualifications achieved was restricted to those who had already left school. In New Zealand the minimum school leaving age was 15 years. The School Certificate is achieved by examination at the age of 15–16 years, Sixth Form Certificate (previously University Entrance) is gained about the age of 16–17 years, and for those hoping to go to university or seek a similar tertiary qualification, Bursary and Scholarship

examinations are taken at the age of 17–18 years. The subjects also completed the Burt Word Reading Test.<sup>11</sup> For this analysis the scores for this test were divided into quartiles separately for young men and young women.

Information was obtained from the sample members' parents at the previous phase of the study when the sample were 15 years old, by a questionnaire filled in by one or both parents. The occupational class of the parents was derived from their reported occupation at that time, using the Elley Irving socio-economic index for New Zealand occupations.<sup>12</sup> When more than one parent was working the highest classification was chosen. Information on family income (in 1988 New Zealand dollars) was also obtained, and included total income from earnings, benefits and other sources. Fewer of the cohort attended for an assessment at aged 15 years than 18 years, so these data are not available for all the subjects.

The New Zealand Census of Populations and Dwellings performed in March 1991 was used to assess the representativeness of our sample. Data on questions asked in the census which were also asked in our study were obtained for each month of age in the age range of our sample. The responses were weighted by the number of the sample at each age to obtain the profile expected for those young people in the country as a whole with the same age distribution as our sample (mean age 18.1 years). The timing of the census, in early March, may have influenced this comparison. In New Zealand the school year ends in December, and thus a greater proportion of young people turning 18 years would have left school in March than would be found if interviewed throughout the year. Similarly some bias could exist in comparisons of the highest school qualifications between our sample, who were interviewed throughout the year, and those who answered census questions in March. For this reason, in assessing representativeness, we compared only the proportions who had gained no school qualification, as a significant number still at school would be yet to perform maximally.

The results were analysed using SPSS.<sup>13</sup> Comparisons of rates were made using chisquare tests for homogeneity, trend or goodness of fit as appropriate. Analysis of contingency tables by the number of sexual partners excluded in the analysis those for whom no data were available, where the responses were 'other', and in the case of the classification of occupational status where the parents were retired. As only eight of the young men were living with a partner, these were included in the 'other' category in this analysis.

## Results

### *Response rate data*

Of the 1037 original cohort members seen at age 3 years, 1027 were believed to be still

alive at age 18 years. In total 879 of the sample attended the research unit for a full assessment, of whom 862 agreed to, and completed, the questions on sexual relationships. Thus the response rate for this section of the study was 83.9% (862/1027) of the survivors of the cohort first seen at 3 years. The main reason for not completing this section of the study, applicable to 128 (12.5%), was not being seen at the unit but having a shortened form of the assessment administered (at home or by telephone) which did not include questions on sexual behaviour. Only 14 (1.4%) of those who attended for a full day of assessments declined to answer the section on sexual behaviour, and a further three (0.3%) failed to complete the questionnaire. The remaining 20 subjects (1.9% of the surviving cohort) were either unlocatable (four subjects) or refused any involvement in the study (13 subjects), or were too intellectually handicapped to respond to the questions (three subjects).

Table 1 compares the 862 (442 males and 420 females) who answered the sexual behaviour questions with the 145 sample members about whom information was available who did not. As expected, the subjects who did not complete the sexual behaviour questions, but completed a shorter interview, were more likely to have left school and not to be living in their parents' home. They were also more likely to be living with a partner as a couple, to be in full time employment, and to be pregnant or have a pregnant partner. No significant differences were found with respect to gender, being unemployed, having had children, or ethnic origin. The mean age of those answering was 18.1 years (standard deviation 0.23 years).

Table 1 Characteristics of those in the cohort who answered and did not answer the questionnaire about sexual behaviour

Characteristic	Answered (N = 862)	Did not answer (N = 145)	
Male	51.3%	51.4%	n.s.
Still at school	26.9%	11.0%	p < 0.001
In full-time job	23.4%	39.3%	p < 0.001
Unemployed	12.5%	13.8%	n.s.
Age at leaving school (if left)	17.1 years	16.9 years	p < 0.01
Living with parent(s)	78.0%	61.6%	p < 0.001
Married/living as a couple	3.6%	11.0%	p < 0.001
Have had children	4.1%	4.3%	n.s.
Currently pregnant/preg partner	0.9%	3.4%	p < 0.05
Weekly income (after tax)	\$124	\$176	p < 0.001
Any Maori ancestry	12.3%	13.1%	n.s.
Occupational class:			
Elley Irving Scale 1 and 2	32.8%	22.8%	n.s.
3 and 4	47.0%	41.4%	
5 and 6	9.4%	6.9%	
Retired/Other	9.2%	12.4%	
No data	1.6%	16.6%	

p > 0.05 was considered to be not significant (n.s.)

Table 2 Comparison between the sample who answered questions and New Zealand Census

Characteristic	Answered	N.Z. Census	
Living arrangements			
With parents	78.0%	69.3%	p < 0.001
With partner	3.6%	2.6%	
Other	18.4%	27.9%	
Still at school	26.9%	13.7%	p < 0.001
Unemployed (confined to those who left school)	17.1%	19.7%	p = 0.11
Obtained no school qualification	9.4%	21.3%	p < 0.001
Any Maori ancestry	12.3%	20.5%	p < 0.001

Differences were found with respect to the New Zealand population at the same age (table 2). Our sample members were less likely to report having any Maori ancestry, and were more likely to be living with their parents. A much higher proportion (27%) of our respondents were still at school compared to only 14% for those of a similar age at census time. However, these figures may overestimate the differences because of the timing of the census, as described above. Nevertheless significantly fewer of our sample had no secondary school qualification than was found in the population as a whole.

### Sexual behaviour

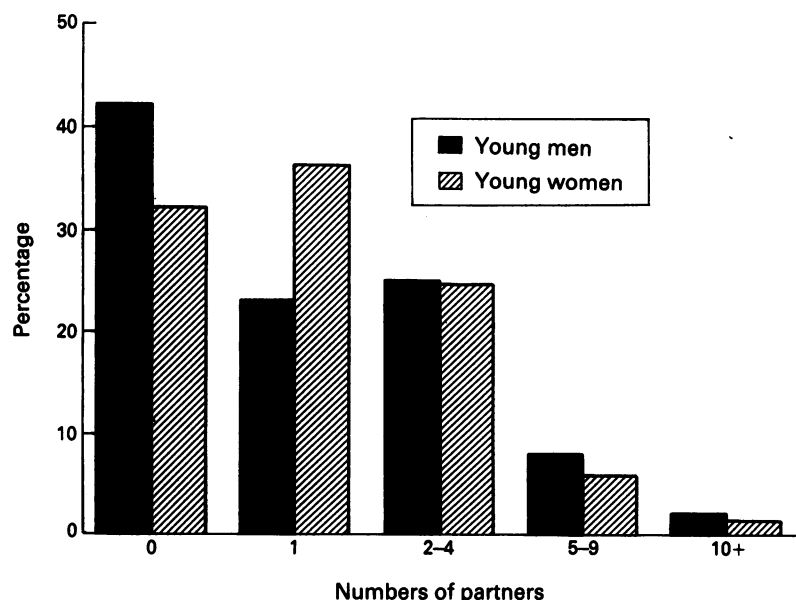
Among the young men, 254/441 (57.6%) reported having sexual intercourse in the last 12 months. For young women the corresponding figure was 284/418 (67.9%). One young man and two young women did not answer this question. The proportion of sexually active females was significantly higher than that of males (p < 0.01). As shown in figure 1, of all the males in the sample who responded, 23.1% reported one sexual partner in the previous 12 months, 24.9% between two and four, and 9.5% five or more. Of the females, 36.4% reported one, 24.6% between two and four, and 6.9% five or more sexual partners in this period. Two of the young men (0.5%) reported having male sexual partners, in each case just one. The mean number of sexual partners (including those with no sexual partners) for the males was 1.7 (standard deviation 3.7), and for the females 1.5 (standard deviation 2.1).

Of those who had been sexually active within the previous 12 months, 59.8% of the young men reported more than one sexual partner during that period, which was significantly greater than the young women 46.5% (p < 0.001).

Within the previous four weeks, 39.9% of the young men reported being sexually active, and of these 13.1% said they had had more than one partner. For the young women the respective rates were 50.2% and 8.1%.

Social, demographic and educational characteristics of the young men and women according to the number of sexual partners in the last 12 months are shown in Table 3(a) and (b). For both the young men and women, those who had left school younger, had lower school qualifications, and were living away from their parents were more likely to be sexually active and have multiple sexual partners.

The numbers of sexual partners for each quartile of the Burt Word Reading Test scores are also shown. (As the results of this test are discrete, there is not exactly a quarter of the sample in each quartile.) Although for the females there was no overall significant difference in the number of partners according to the reading score, there was a significant trend (p < 0.005) for those with higher scores to have had no sexual partners in the last year. For the males there was an overall significant difference.



For both the young men and women there was no overall significant association found between the number of sexual partners in the previous 12 months and either the occupational class or the income of the parents three years earlier. However for the males, but not

the females, there was a significant trend ( $p < 0.05$ ) in the proportion of the sample reporting no sexual partners with increasing levels of parental income.

### Condom use

Of those who reported having had sexual intercourse in the previous 12 months, 37.6% of the young women, and 48.0% of the young men reported using condoms "usually or always".

Such use of condoms reported in relation to the number of sexual partners in the previous 12 months is shown in Figure 2. For the females a significant trend ( $p = 0.013$ ) was found with regular use of condoms being *less* common by the partners of women having more partners. For the males there was no significant difference in their use with the number of partners.

### *Sexually transmitted diseases*

A history of ever having had an STD was reported by 48/420 (11.4%) of the young women and 11/442 (2.5%) of the young men. Within the previous 12 months there were 31 females (one of whom reported not being sexually active during this period) and 5 males who reported having had an STD.

The diseases reported in the last year by

*Table 3(a) Reported number of sexual partners according to various characteristics of male sample members*

<i>Number of Partners</i>	<i>Characteristic</i>					
	<i>Age left school</i>					
	Still at school (N=122)	17yr or more (N=205)	Less than 17yr (N=114)	Total (N=441)		
0	53.3% (65)	48.8% (100)	19.3% (22)	42.4% (187)		
1	26.2% (32)	20.0% (41)	25.4% (29)	23.1% (102)		
2-4	15.6% (19)	24.9% (51)	35.1% (40)	24.9% (110)		
5+	4.9% (6)	6.3% (13)	20.2% (23)	9.5% (42)		
	Chi square = 48.8 Degrees of freedom = 6 p < 0.001					
	<i>Highest school qualification (confined to those who have left school)</i>					
	Bursary or Scholarship (N=50)	6th Form Cert or University Entrance (N=130)	No qualification or School Certificate (N=130)	Other or No data (N=9)	Total (N=319)	
0	56.0% (28)	47.7% (62)	21.5% (28)	44.4% (4)	38.2% (122)	
1	26.0% (13)	16.9% (22)	25.4% (33)	22.2% (2)	21.9% (70)	
2-4	16.0% (8)	27.7% (36)	33.8% (44)	33.3% (3)	28.5% (91)	
5+	2.0% (1)	7.7% (10)	19.2% (25)	0.0% (0)	11.3% (36)	
	Chi square = 35.7 Degrees of freedom = 6 p < 0.001					
	<i>Burt Word Reading Test score</i>					
	Highest quartile (N=81)	Second Quartile (N=110)	Third Quartile (N=103)	Lowest Quartile (N=138)	No data (N=9)	Total (N=441)
0	51.9% (42)	48.2% (53)	48.5% (50)	29.0% (40)	22.2% (2)	42.4% (187)
1	14.8% (12)	25.5% (28)	21.4% (22)	25.4% (35)	55.6% (5)	23.1% (102)
2-4	27.2% (22)	20.9% (23)	23.3% (24)	29.0% (40)	11.1% (1)	24.9% (110)
5+	6.2% (5)	5.5% (6)	6.8% (7)	16.7% (23)	11.1% (1)	9.5% (42)
	Chi square = 25.3 Degrees of freedom = 9 p = 0.003					
	<i>Parents' total income (when sample aged 15yr)</i>					
	\$45,000 and above (N=112)	\$35,000-\$44,000 (N=89)	\$25,000-\$34,000 (N=103)	less than \$25,000 (N=100)	No data (N=37)	Total (N=441)
0	52.7% (59)	41.6% (37)	44.7% (46)	33.0% (33)	32.4% (12)	42.4% (187)
1	17.9% (20)	24.7% (22)	25.2% (26)	24.0% (24)	27.0% (10)	23.1% (102)
2-4	25.0% (28)	22.5% (20)	21.4% (22)	31.0% (31)	24.3% (9)	24.9% (110)
5+	4.5% (5)	11.2% (10)	8.7% (9)	12.0% (12)	16.2% (6)	9.5% (42)
	Chi square = 12.8 Degrees of freedom = 9 p = 0.17					
	<i>Occupational class of parents (when sample aged 15yr)—Elley Irving socio-economic index</i>					
	1 & 2 (N=140)	3 & 4 (N=213)	5 & 6 (N=39)	Retired or other (N=21)	No data (N=28)	Total (N=441)
0	47.1% (66)	42.3% (90)	28.2% (11)	47.6% (10)	35.7% (10)	42.4% (187)
1	21.4% (30)	25.4% (54)	20.5% (8)	14.3% (3)	25.0% (7)	23.1% (102)
2-4	25.7% (36)	23.0% (49)	33.3% (13)	33.3% (7)	17.9% (5)	24.9% (110)
5+	5.7% (8)	9.4% (20)	17.9% (7)	4.7% (1)	21.4% (6)	9.5% (42)
	Chi square = 10.0 Degrees of freedom = 6 p = 0.13					
	<i>Living arrangements</i>					
	With parents (N=353)	Flatting (N=35)	Other (N=38)	No data (N=15)	Total (N=441)	
0	49.0% (173)	22.9% (8)	7.9% (3)	20.0% (3)	42.4% (187)	
1	22.1% (78)	11.4% (4)	42.1% (16)	26.7% (4)	23.1% (102)	
2-4	20.4% (72)	45.7% (16)	42.1% (16)	40.0% (6)	24.9% (110)	
5+	8.5% (30)	20.0% (7)	7.9% (3)	13.3% (2)	9.5% (42)	
	Chi square = 19.8 Degrees of freedom = 3 p < 0.01					

Table 3(b) Reported number of sexual partners according to various characteristics of female sample members

Number of Partners	Characteristic				
	<i>Age left school (years)</i>				
	Still at school (N=112)	17 or more (N=199)	Less than 17 (N=107)	Total (N=418)	
0	50.0% (56)	29.7% (59)	17.8% (19)	32.1% (134)	
1	32.1% (36)	39.2% (78)	35.5% (38)	36.4% (152)	
2-4	13.4% (15)	24.1% (48)	37.4% (40)	24.6% (103)	
5+	4.5% (5)	7.0% (14)	9.3% (10)	6.9% (29)	
	Chi square = 34.2 Degrees of freedom = 6 $p < 0.001$				
	<i>Highest school qualification (confined to those who have left school)</i>				
	Bursary or Scholarship (N=34)	6th Form Cert or University Entrance (N=159)	No qualification or School Certificate (N=101)	Other or No data (N=14)	Total (N=308)
0	41.2% (14)	30.2% (48)	10.9% (13)	21.4% (3)	25.3% (78)
1	35.3% (12)	41.5% (66)	34.6% (35)	35.7% (5)	38.3% (118)
2-4	17.6% (6)	22.0% (35)	42.6% (43)	28.6% (4)	28.6% (88)
5+	5.9% (2)	6.3% (10)	9.9% (10)	14.3% (2)	7.8% (24)
	Chi square = 23.8 Degrees of freedom = 6 $p < 0.001$				
	<i>Burt Word Reading Test score</i>				
	Highest Quartile (N=108)	Second Quartile (N=119)	Third Quartile (N=88)	Lowest Quartile (N=90)	No data (N=13)
0	39.8% (43)	34.5% (41)	27.3% (24)	25.6% (23)	23.1% (3)
1	32.4% (35)	38.7% (46)	34.1% (30)	38.9% (35)	46.1% (6)
2-4	21.3% (23)	17.6% (21)	29.5% (26)	32.2% (29)	30.8% (4)
5+	6.5% (7)	9.2% (11)	9.1% (8)	3.3% (3)	0.0% (0)
	Chi square = 13.9 Degrees of freedom = 9 $p = 0.12$				
	<i>Parents' total income (when sample aged 15 yr)</i>				
	\$45,000 and above (N=104)	\$35,000-\$44,000 (N=99)	\$25,000-\$34,000 (N=76)	less than \$25,000 (N=105)	No data (N=34)
0	26.9% (28)	36.4% (36)	38.2% (29)	32.4% (34)	20.6% (7)
1	40.4% (42)	34.3% (34)	32.9% (25)	36.2% (38)	38.2% (13)
2-4	25.0% (26)	23.2% (23)	19.7% (15)	26.7% (28)	32.4% (11)
5+	7.7% (8)	6.0% (6)	9.2% (7)	4.8% (5)	8.8% (3)
	Chi square = 5.4 Degrees of freedom = 9 $p = 0.80$				
	<i>Occupational class of parents (when sample aged 15yr)—Elley Irving socio-economic index</i>				
	1 & 2 (N=142)	3 & 4 (N=191)	5 & 6 (N=42)	Retired or Other (N=27)	No data (N=16)
0	39.4% (56)	31.4% (60)	31.0% (13)	14.8% (4)	6.3% (1)
1	33.1% (47)	36.6% (70)	40.5% (17)	44.4% (12)	37.5% (6)
2-4	18.3% (26)	25.1% (48)	28.6% (12)	33.3% (9)	50.0% (8)
5+	9.2% (13)	6.8% (13)	0.0% (0)	7.4% (2)	6.3% (1)
	Chi square = 8.5 Degrees of freedom = 6 $p = 0.20$				
	<i>Living arrangements</i>				
	With parents (N=316)	With partner (N=23)	Flatting (N=39)	Other (N=32)	No data (N=8)
0	37.3% (118)	4.3% (1)	15.4% (6)	18.8% (6)	37.5% (3)
1	35.7% (113)	69.6% (16)	23.0% (9)	40.6% (13)	12.5% (1)
2-4	22.5% (71)	26.1% (6)	33.3% (13)	37.5% (12)	12.5% (1)
5+	4.4% (14)	0.0% (0)	28.2% (11)	3.1% (1)	37.7% (3)
	Chi square = 53.1 Degrees of freedom = 6 $p < 0.001$				

females were chlamydia (11), gonorrhoea (2), genital warts (5), herpes (2) or an un-named STD (12). Three women had two different conditions. The males reported chlamydia

(1), genital warts (1), or an un-named STD (3). The reported incidence of any sexually transmitted disease in the previous year among those who reported sexual intercourse during this time was 33/285 (11.6%) for females and 5/256 (2.0%) for males.

There was a significant trend in the proportion experiencing at least one sexually transmitted disease within the previous 12 months according to the number of sexual partners for both females ( $p < 0.001$ ) and males ( $p < 0.05$ ) as is shown in figure 3.

## Discussion

Our response rate of 83.9% of the surviving cohort followed since the age of 3 years is appreciably better than those usually obtained in studies of sexual behaviour.<sup>14</sup> Moreover only 1.4% refused to answer the questionnaire, and most exclusions were because subjects did not attend for a full day assessment. Comparison of the cohort not questioned with those interviewed about their sexual behaviour was possible and revealed some differences, including a higher rate of pregnancy, and rate of living with a partner, suggesting that members of the cohort who were not included in our sample may have been more sexually active. Thus our results may

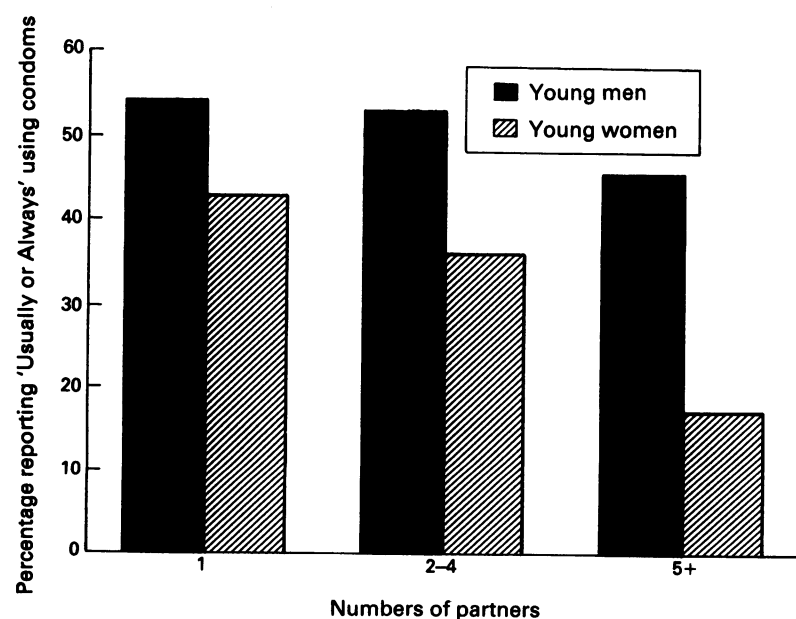


Figure 2 Proportion of sexually active young men and women reporting "Usually or Always" using condoms according to number of sexual partners in the previous 12 months

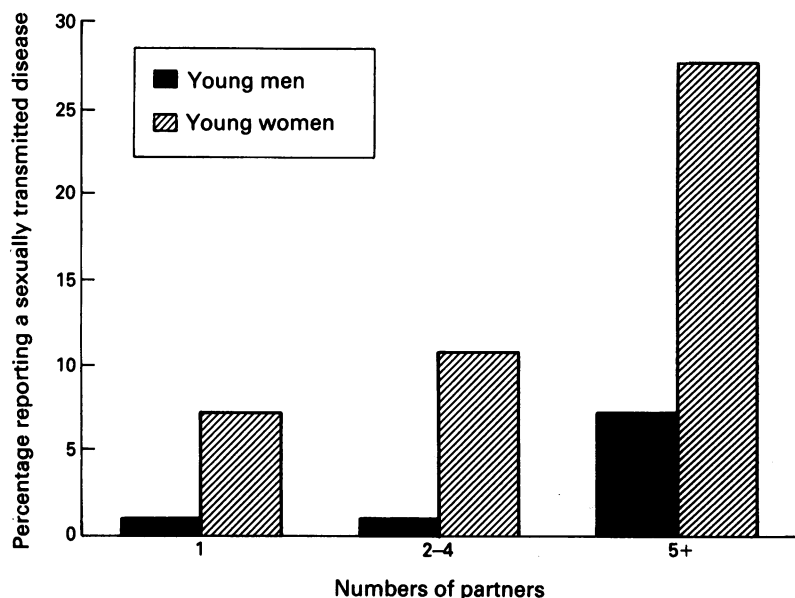


Figure 3 Proportion of sexually active young men and women reporting any sexually transmitted disease according to number of sexual partners in the previous 12 months

underestimate the sexual activity of the whole cohort. Nevertheless such an effect is likely to be small because of the high response rate.

Similarly a comparison with all young New Zealanders of a similar age using census data showed that those in our sample were more likely to be living with their parents, still at school, and to have higher school achievements. These characteristics we found to be associated with less sexual activity, therefore our sample may underestimate the proportion sexually active and having multiple partners within the population as a whole.

Although it was not possible to validate directly the answers provided, our pilot study suggested that the questions were understandable, acceptable and would be answered truthfully. Computer presented questionnaires about sexual behaviour have been found to be more acceptable than either face-to-face interviews or written questionnaires among adolescent girls.<sup>15</sup> Most adolescents appear to be honest and consistent in providing such information. In one study where the same sample was questioned two years apart, 83% said they had provided truthful answers two years previously and the responses were consistent, 10% said they had been truthful but the answers were inconsistent, and the remaining 7% said they had been untruthful when first questioned.<sup>16</sup> Both virgins and non-virgins were equally likely to say they had lied, and although the numbers were small, there was a tendency for males to lie, and say they had had sex, and for females to lie and say they had not had sex.

We found that significantly more of the young women (67.9%) than the young men (57.6%) reported having sexual intercourse during the previous twelve months. Such a gender difference has been found for young people of a similar age in recent studies in England,<sup>17</sup> Norway,<sup>18</sup> Sweden<sup>19</sup> and Denmark.<sup>20</sup> Conversely a recent study from the USA on the sexual activity of high school

students found that more 12th grade (18 year old) males of all ethnic origins reported being sexually active than comparable females.<sup>21</sup> In a population based national study in the USA performed in 1988 the proportion of female 18 year olds reporting ever having sexual intercourse was 69.5%, very similar to our rate for intercourse in the last 12 months of 67.9%.<sup>22</sup> In a separate national survey of adolescent males in that country in the same year, the estimate of the proportion of eighteen year olds who had ever had sexual intercourse was 71.6%.<sup>23</sup> These results suggest differences between the USA and New Zealand with respect to male, but not female rates of sexual activity at this age.

In the four weeks prior to the interview we again found similar gender differences. The young women were more likely to have been sexually active. But of those who were active the young men were more likely to have had more than one partner.

Although previous population based studies on sexual activity in New Zealand have not been performed at this age, a survey of first year university and teacher's college students, of a similar age, was performed in 1969-70 with a very high response rate. In that survey of 2175 students only 27% of male and 22.5% of females reported ever having or attempting sexual intercourse. The most comparable group in our survey are first year university or teacher's college students, and those at school who reported an intention to go to either of these institutions. Amongst this group 59.1% of the males and 69.4% of the females reported having sexual intercourse in the previous 12 months. Because our respondents were slightly younger than in the earlier study, the true difference will be even greater. This comparison shows a major increase in sexual activity by both young men and women over the last twenty years. The increase is most marked amongst young women who now have a higher prevalence of sexual activity than young men at age 18. These findings are confirmed by an increasing rate of adolescent pregnancy in New Zealand.<sup>24</sup> Information from other countries such as the United Kingdom<sup>25</sup> and the USA<sup>26</sup> have also suggested earlier sexual activity in recent cohorts.

A high proportion of both the young men and women in our study reported more than one sexual partner within the last year. The rates of sexual partner change are very much higher than those recorded in a national survey in New Zealand of men and women aged 16 to 60 years carried out in 1989.<sup>27</sup> In that survey, of those who reported any sexual partners in the previous year, only 17% reported more than one. In comparison in our study, of those who reported any sexual intercourse, 46.5% of females and 59.8% of males reported more than one partner. Only 5% of sexually active people in the national study reported four or more partners in the previous 12 months, compared with 15.1% and 22.8% of females and males in our study. The difference in patterns of sexual behaviour

probably reflect higher rates of partner change in adolescence, but could also reflect the higher response rate in our survey (no data were given for response rate in the national survey).

The numbers of partners reported by the New Zealand young people in our study cannot be compared directly with results from many surveys from other countries as they report using wider age ranges, and sexual behaviour may change considerably over the years from adolescence to young adulthood. Nevertheless two surveys from countries which report similar levels of overall sexual activity among young people do provide comparable information. A regional survey in England reported mean numbers of partners at age 18 years, in an analysis restricted to non virgins only.<sup>15</sup> The mean number of new partners per year was 2.2 for males and 1.5 for females. By comparison, restricting our analysis to subjects who reported sexual intercourse in the last year, the mean number of partners was 3.0 for males and 2.2 for females. A survey in Denmark reported a similar proportion of young men aged 18 and 19 with five or more partners in the past year (9.6%) as we found among New Zealand 18 year olds (9.5%).<sup>18</sup> In Denmark the highest rate of partner change for both men and women occurred at ages 18 and 19.

It was a concern to find that 11.5% of the young women in the cohort reported having experienced a sexually transmitted disease. Gonorrhoea and chlamydial infection, the major causes of pelvic inflammatory disease<sup>28</sup> with the associated complications of infertility and ectopic pregnancy, were reported within the previous year by nearly 5% of the sexually active young women. The true occurrence was probably higher than this as many cases of these diseases in women can be asymptomatic. The striking gender difference is unlikely to be due to relative under-recognition by the young men as this is commoner among women. Although clinic attendance rates for most STDs over all ages are commoner in males in New Zealand<sup>29</sup> as in other similar countries, in the UK there is a higher attendance rate for gonorrhoea among women under 20 years.<sup>30</sup>

As expected the incidence of sexually transmitted diseases increased with the number of sexual partners, most significantly for those with five or more in the previous year. A disturbing finding was that women with more partners tended to be less likely to use condoms, and no increase in their use was found by men with more partners. These findings are similar of those of a recent study among Canadian college students.<sup>31</sup>

We used a univariate analysis of social and educational variables to seek features that would identify young people who are likely to be sexually active and have multiple partners. The findings indicate that those young people most at risk of STDs are better identified by their school attendance and performance, rather than the socio-economic status of their parents, as indicated by their occupation and

income. The use of this form of statistical technique although valid for identifying the group of young people likely to have more partners, should not be interpreted as indicating the cause of that behaviour.

## Conclusions

Our findings suggest that there is no reason for complacency with respect to the spread of HIV among young New Zealanders when it is introduced into this group. Even though we showed that our sample is likely to underestimate sexual activity in this age group as a whole, we found that among those questioned near their eighteenth birthday STDs were common, as was having multiple sexual partners, possibly at a higher rate than in some other comparable countries. The young women with a greater number of sexual partners made less use of condoms than those with fewer partners, and there was no increase in their use by men with more partners.

Limiting the potential for the spread of HIV will depend on changes in sexual behaviour amongst the young—both reducing the number of sexual partners and increasing the use of condoms. Changes introduced early in the course of the epidemic will have a disproportionately greater effect than changes introduced later.<sup>32</sup>

We conclude that activities to promote safer sexual behaviour should be aimed at all young New Zealanders because of the very high prevalence of sexual activity we have identified. Particular targeted programmes should also be designed for those young people who do not remain at or achieve well at school and are living away from their parents, as these young people are more likely to have multiple sexual partners. A challenge will be to develop methods to bring about changes among these groups of young people, in the present environment of uncertainty about the future epidemic.<sup>33</sup>

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